VALUE LINE FINANCIAL RATINGS FOR THE SEVEN RHCs

Regional Holding Company	CAPM Beta	Safety[1]	Company's Financial Strength[2]	Stock's Price Stability[3]	Earnings Predictability[4]
Ameritech	0.80	1	A+	95	100
Bell Atlantic	0.90	1	A+	90	100
Bell South	0.80	1	A+	95	95
NYNEX	0.85	1	A+	95	95
Pacific Telesis	0.90	1	A+	90	95
Southwest Bell	0.90	1	A+	90	100
U.S. West	0.85	1	A+	95	50[5]
Averages	0.86	1	A+	93	91

Source: Value Line Investment Survey, July 16, 1993.

[1]   Safety is an index ranging in value from 1 (for highest safety) to 5 (for lowest safety).

[2]   A+ is best. The average financial strength is computed by assigning numerical values to the letter ratings (12 for A+, ..., 11 for A; 10 for A-, ..., 1 for D-) averaging the numbers, and then reconverting back to a letter ranking.

[3]   Most stable is 100; least stable is 0.

[4]   Most predictable is 100; least predictable is 0.

[5]   This relatively low ranking is related to the sale of its financial services business which reduces expected earnings per share in 1993 and 1994.

VALUE LINE FINANCIAL RATINGS FOR THREE "CLOSE TO PURE PLAY" CABLE COMPANIES

Major Cable Company	CAPM Beta	Safety[1]	Company's Financial Strength[2]	Stock's Price Stability[3]	Earnings Predictability[4]
Cablevision	1.45	4	C+	25	40
Comcast Corp.	1.60	3	B	25	35
Tele-Comm. Inc. (TCI)	1.65	3	B	35	30
Averages	1.57	3.3	B-	28	35

Source: Value Line Investment Survey, June 25, 1993.

[1] Safety is an index ranging in value from 1 (for highest safety) to 5 (for lowest safety).

[2] A+ is best. The average financial strength is computed by assigning numerical values to the letter ratings (12 for A+, ..., 11 for A; 10 for A-, ..., 1 for D-) averaging the numbers, and then reconverting back to a letter ranking.

[3] Most stable is 100; least stable is 0.

[4] Most predictable is 100; least predictable is 0.

VALUE LINE FINANCIAL RATINGS FOR TWO SMALL TELEPHONE COMPANIES

Company	CAPM Beta	Safety[1]	Company's Financial Strength[2]	Stock's Price Stability[3]	Earnings Predictability[4]
Alltel Corp.	1.00	2	B++	85	95
Century Telephone	1.20	3	B++	45	85
Average	1.10	2.5	B++	65	90

Source: Value Line Investment Survey, July 16, 1993.

[1] Safety is an index ranging in value from 1 (for highest safety) to 5 (for lowest safety).

[2] A+ is best. The average financial strength is computed by assigning numerical values to the letter ratings (12 for A+, ..., 11 for A; 10 for A-, ..., 1 for D-) averaging the numbers, and then reconverting back to a letter ranking.

[3] Most stable is 100; least stable is 0.

[4] Most predictable is 100; least predictable is 0.

APPENDIX 7

AVERAGE COMMON EQUITY RATIOS, PRE-TAX
INTEREST COVERAGE RATES, AND RETURN ON
AVERAGE EQUITY OVER THE 1988-92 PERIOD[1] FOR:

- **THE SEVEN RHCs**
- **THE TWO SMALL INDEPENDENT TELEPHONE COMPANIES**
- **THE S&P INDUSTRIALS**
- **THE THREE "CLOSE TO PURE PLAY" CABLE COMPANIES**

[1]   The pre-tax coverage ratio for the three cable companies is
the average for 1990-92.

AVERAGE COMMON EQUITY RATIO, PRE-TAX INTEREST COVERAGE, AND RETURN ON EQUITY FOR THE SEVEN RHCs, THE TWO SMALL INDEPENDENT TELEPHONE COMPANIES, AND THE S&P INDUSTRIALS: 1988-92

Company	Common Equity Ratio (%)	Pre-Tax Interest Coverage (Ratio)	Return on Average Equity (%)
RHCs			
Ameritech	61.3	4.84	16.1
Bell Atlantic	52.6	3.30	15.0
Bell South	63.6	4.24	12.9
NYNEX	58.3	3.38	10.7
Pacific Telesis	59.2	4.13	14.2
Southwest Bell	61.4	3.86	13.3
U.S. West	54.9	3.22	12.4
Average of RHCs	58.8	3.85	13.5
Independents			
Alltel	54.2	4.42	18.7
Century	51.1	3.20	13.5
Average	52.7	3.81	16.1
S&P Industrials	56.2	3.10	12.9

Sources: (1) Standard and Poor's <u>CREDIT REVIEW,</u> <u>TELECOMMUNICATIONS</u>, July 19, 1993.

(2) Standard & Poor's Compustat Services, Inc., Compustat II.

**COMMON EQUITY RATIO (AVERAGE 1988-92),
PRE-INTEREST COVERAGE (AVERAGE 1988-92),
AND RETURN ON NET WORTH (AVERAGE 1988-92)
FOR THE THREE "CLOSE TO PURE PLAY"
CABLE COMPANIES**

Company	Common Equity Ratio (%)	Pre-Tax Interest Coverage	Return on Common Equity (%)
Cablevision Systems	(67.2)	0.06	NMF
Comcast	10.1	0.41	NMF
Tele-Comm. Inc. (TCI)	18.5	0.98	(13.6)
Average	(12.9)	0.48	(13.6)

NMF = No meaningful figure because some (or all) of the common equity values are negative.

[1] Includes minority interest.

Sources: (1) Standard & Poor's Compustat Services, Inc., Compustat II.

(2) Standard & Poor's, Corporate Industry Focus, May 1993, p. 179.

APPENDIX 8

S&P TELEPHONE FINANCIAL RATIO GUIDELINES

CREDIT COMMENTS

TELEPHONE FINANCIAL RATIO GUIDELINES REVISED

S&P has revised the financial ratio guidelines it uses in rating telephone utility company debt. However, the modifications are modest, and no ratings will be changed as a result. Guidelines are revised as the environment in which local telephone companies operate continues to evolve. Changes are made as necessary to ensure that the guidelines are appropriate based on developing industry conditions.

The spreads between minimums and maximums in the updated guidelines are still fairly wide, emphasizing the need to develop a financial profile using all of the guidelines together, as S&P does internally, rather than concentrating on a single financial parameter. The net cash flow-to-debt guideline has been redefined as net cash flow-to-total debt from net cash flow-to-long-term debt, reflecting S&P's practice of including short-term debt used to fund construction in permanent capital. S&P has also added to the list after-tax funds from operations interest coverage. This ratio is helpful in clarifying some of the differences that are introduced into pretax interest coverages as a result of variations in accounting, as well as the impact of certain variables that are outside of the company's control, such as different methods of state taxation.

USING GUIDELINES

Although financial ratios tell only a part of the rating story, a combination of ratios provides an indication of the overall financial profile appropriate for a given rating level. S&P publishes these guidelines to provide insight into the rating process. However, ratings also depend heavily on qualitative judgments. Evaluations of business risk, which generally determines the stability of financial performance, are not neatly quantifiable. Even some measures of financial risk, such as asset quality and financial flexibility, cannot be easily determined solely from published financial reports. Since ratings are forward looking, S&P applies guidelines based on expected future financial performance, not historical results.

EVOLUTION OF GUIDELINES

When S&P introduced specific financial ratio guidelines for telephone companies in 1985, competition had become the dominant industry issue. Telephone companies were divided into several risk classifications, reflecting the relative attractiveness of competitive entry based on the nature of service territories. The logic of this approach rested on the cost structure of service provision and the rate structures and industrywide revenue-sharing arrangements in place at the time. But the industry's operating and regulatory environments have changed, and S&P's prospective view of ratings requires appropriate revisions in methodology. As a result, S&P has focused increasingly on company-specific business risk factors over the last several years.

Telephone companies with similar service territories used to have very similar business risks, but competitive and regulatory changes have affected them to varying degrees. As a result of uneven impacts of these pressures, companies with similar service areas may have increasingly different business risk profiles. Therefore, they may have different financial profiles at the same rating level.

COMPETITION AND REGULATION

Competition now exists for a wide spectrum of services, such as telephone rentals, short-haul long distance, and even switched local service, that were once provided by local telephone companies operating as true monopolies. S&P has therefore reoriented its view of competition from an examination of niche competitive threats to a more inclusive, broader view focused on an issuer's share of the total market. This broader view starts with some service-by-service analysis, but gives a better sense of overall market position than the previous emphasis on discrete competitive threats.

The regulatory picture has changed as well. When guidelines were last revised in 1985, the regulatory environment still consisted almost entirely of minor variations on classic utility

COMMENTS

rate-of-return regulation. The adoption of alternative regulatory plans that rest on other considerations (e.g., price caps) or that exempt earnings from competitive portions of the business from regulation have greatly increased the diversity of the regulatory environment. In addition, the amount of flexibility that companies have to price services varies considerably.

These changes in the competitive and regulatory frameworks have stimulated telephone companies to move toward cost-based pricing schemes from the formerly dominant fully distributed costing methodology. In some cases, probably most notably in Centrex pricing, this change has been voluntary. In others, direct regulatory intervention has precipitated the change. Examples of such intervention are the unbundling of access charges recently ordered by the New York Public Service Commission and the California Public Utility Commission's actions to reduce toll rates in anticipation of intra-LATA (local access and transport area) competition.

As the companies that face the strongest direct competitive pressure shift pricing schedules to a cost basis, the rest of the industry will be compelled to follow suit. The result is likely to be an increase in competitive exposure for those telephone companies whose rate structures have made them absolutely immune to economic competition in the past. This will only heighten the need to focus on the impact of business risk on individual companies' creditworthiness. The adoption of a single set of guidelines for all local telephone companies anticipates this need. The updated guidelines should be viewed as evolutionary, not revolutionary. Although the new guidelines are likely to remain in place for some time, S&P will continue to review them and make minor changes periodically to ensure their relevance to the rating process.

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Telephone financial ratio guidelines	AA	A	BBB
Pretax interest coverage (x)	Over 4.3	3.5-3.0	2.5-4.0
Total debt to total capital (%)	Under 42	40-62	58-62
Net cash flow to average total debt (%)	Over 32	25-33	30-60
Funds from operations interest coverage (x)	Over 8.5	8.0-7.0	3.5-3.5

Glossary

Pretax interest coverage: Income from continuing operations before taxes, plus minority interest, national tax and interest expense, divided by interest incurred. Capitalized interest is excluded from interest expense but included in interest incurred.

Total debt to total capital: The sum of notes payable, the short-term obligations including current maturities of long-term debt and capitalized obligations, plus long-term debt including capital lease obligations, divided by the sum of total capital. Total capital is the sum of short-term debt, long-term debt, preferred stock including minority interest, and common equity.

Net cash flow to average total debt: Funds from operations (before working capital changes) minus dividends paid, divided by average total debt.

Funds from operations interest coverage: The sum of funds from operations before working capital changes) and interest expense, divided by interest incurred. Note: For comparability, significant operating lease obligations should be capitalized.

APPENDIX 9

ANALYSIS OF THE RELATIONSHIP BETWEEN SIZE AND RETURNS WITHIN THE TELECOMMUNICATIONS INDUSTRY

FINANCIAL STATISTICS FOR THE SEVEN RHCS
FOR THE YEAR ENDED DECEMBER 31, 1992

Company Name	Revenue (Million $)	Return on Average Equity[1] (Percent)	Pre-Tax Return on Average Capital[2] (Percent)	Common Equity Ratio (Percent)
Ameritech Corp.	11,153.0	17.8	14.5	51.1
Bell Atlantic Corp.	12,647.0	18.2	13.2	43.7
BellSouth Corp.	15,201.6	12.3	12.4	60.5
NYNEX Corp.	13,155.0	13.9	11.8	53.5
Pacific Telesis Group	9,935.0	14.2	12.0	56.0
Soutwestern Bell Corp.	10,015.4	14.3	11.7	57.1
US West, Inc.	10,281.1	13.2	9.6	45.3
Averages	11,769.7	14.8	12.2	52.5
Median	11,153.0	14.2	12.0	53.5

[1] Nominal return on average equity.

[2] Includes deferred income taxes.

Source of Information: Standard & Poor's CREDITREVIEW, July 19, 1993.

FINANCIAL STATISTICS FOR SELECTED INDEPENDENT
COMPANIES FOR THE YEAR ENDED DECEMBER 31, 1992

Company Name	Revenue (Million $)	Return on Average Equity[1] (Percent)	Pre-Tax Return on Average Capital[2] (Percent)	Common Equity Ratio (Percent)
ALLTEL Corp.	2,092.1	19.1	17.5	54.6
Central Telephone Co.	786.6	11.1	9.5	54.0
Century Telephone Enterprises	356.8	17.0	14.7	47.0
Citizens Utilities Co.	589.3	14.8	13.7	61.1
Contel of California	414.0	40.1	35.4	60.7
Contel of New York	183.9	5.8	6.4	42.5
United Telephone Co. of Florida	760.9	14.2	13.8	60.8
United Telephone Co. of Ohio	371.8	18.8	15.1	57.6
United Telephone Co. of Pennsylvania	205.7	15.5	12.8	54.9
Averages	640.1	17.4	15.4	54.8
Median	414.0	15.5	13.8	54.9

[1] Nominal return on average equity.
[2] Includes deferred income taxes.

Source of Information: Standard & Poor's CREDITREVIEW, July 19, 1993.

FINANCIAL STATISTICS FOR THE INDIVIDUAL OPERATING UNITS OF THE SIX
INDEPENDENT TELEPHONE COMPANIES IN 1991
(Sorted In Descending Order by Number of Access Lines)

Operating Units With More Than 100,000 Access Lines	Total Operating Revenue 1991	Access Lines 1991	Debt Rate 1991	After-Tax Equity Rate 1991	After-Tax Capital Rate 1991	Pre-Tax Capital Rate 1991	Equity as a % of Capital 1991	Equity as a % of Assets 1991
UNITED TEL CO OF FL	710,789,000	1,104,431	8.87	13.15	11.52	16.96	62.02%	47.16%
CENTRAL TEL CO	355,033,744	698,104	8.48	23.79	18.32	28.52	64.30%	48.84%
UNITED TEL CO OF OH	344,732,181	473,140	8.77	18.40	14.59	22.00	60.43%	39.68%
CONTEL OF VA, INC D/B/A/ GTE VA	284,324,000	381,990	9.37	10.11	9.77	13.48	54.98%	37.18%
CONTEL OF CA, INC	409,198,000	336,465	9.70	39.04	27.50	43.29	60.66%	39.60%
UNITED TEL CO OF PA	188,109,602	308,111	8.28	16.85	13.11	19.43	56.31%	38.61%
CENTRAL TEL CO OF FL	170,800,991	286,113	8.89	9.46	9.24	13.15	61.95%	44.66%
UNITED TEL - SE, INC.	159,498,641	269,594	9.19	17.76	14.23	21.19	58.78%	41.53%
CONTEL OF NY, INC D/B/A GTE NY	188,139,000	253,060	9.21	8.57	8.90	11.68	48.58%	34.01%
CENTRAL TEL CO OF VA	148,136,185	224,785	8.37	13.23	11.48	17.13	64.05%	43.69%
UNITED TEL CO OF MO	140,452,924	196,518	8.00	14.13	11.27	16.30	53.40%	39.20%
UNITED TEL CO OF IN, INC	133,273,729	189,989	7.92	17.11	13.60	20.65	61.84%	45.68%
CENTRAL TEL CO OF IL	134,388,838	184,638	7.53	16.42	13.32	20.45	65.15%	39.16%
CONTEL OF MO, INC D/B/A GTE MO	186,357,000	177,386	9.20	17.41	13.90	20.55	57.26%	39.06%
CONTEL OF TX, INC D/B/A GTE TX	172,151,000	170,859	10.03	19.17	15.56	23.28	60.45%	42.42%
CONTEL OF IL, INC D/B/A GTE IL	137,002,000	156,788	9.81	14.32	12.67	18.73	63.42%	40.74%
UNITED TEL CO OF NJ, INC	101,173,798	147,782	7.30	15.95	12.60	19.12	61.26%	45.15%
CONTEL OF IN, INC D/B/A GTE IN	105,591,995	147,248	8.41	17.79	14.44	22.05	64.21%	40.53%
CENTEL - TEXAS, INC.	93,491,803	136,269	10.25	17.43	14.89	22.41	64.72%	43.47%
ALLTEL PENNSYLVANIA, INC.	87,296,727	134,149	7.77	24.10	17.09	26.26	57.07%	41.19%
UNITED TEL - NORTHWEST	86,557,591	113,566	8.43	20.62	15.53	23.53	58.20%	39.07%
UNITED TEL CO OF TX, INC	101,772,217	113,304	9.11	20.94	16.51	25.24	62.52%	44.52%
UNITED TEL CO OF MN, INC	72,478,892	109,915	8.65	17.22	13.35	19.65	54.85%	41.16%
ALLTEL CAROLINA, INC.	71,439,328	103,208	7.76	24.63	16.05	24.12	49.14%	36.35%
AVERAGE	190,924,549	267,392	8.72	17.82	14.14	21.21	59.40%	41.36%
MEDIAN	NC	NC	8.77	17.41	13.90	20.65	60.66%	41.16%

Source: "Statistics of the Local Exchange Carriers 92," USTA, July 1992.

FINANCIAL STATISTICS FOR THE INDIVIDUAL OPERATING UNITS OF THE SIX
INDEPENDENT TELEPHONE COMPANIES IN 1991 (CONTINUED)
(Sorted In Descending Order by Number of Access Lines)

Operating Units With Between 40,000 and 100,000 Access Lines	Total Operating Revenue 1991	Access Lines 1991	Debt Rate 1991	After-Tax Equity Rate 1991	After-Tax Capital Rate 1991	Pre-Tax Capital Rate 1991	Equity as a % of Capital 1991	Equity as a % of Assets 1991
CONTEL OF MN, INC D/B/A GTE MN	76,342,435	99,941	8.46	16.11	13.57	20.75	66.84%	42.07%
CONTEL OF NC, INC D/B/A GTE NORTH CAR	79,348,013	94,190	10.43	23.30	18.21	27.60	60.44%	40.23%
CONTEL OF THE SOUTH, INC AL D/B/A GTE AL	76,079,053	88,263	8.21	16.33	13.01	19.45	59.17%	40.90%
CONTEL OF THE NORTHWEST, INC D/B/A GTE SYS OF N	84,602,000	87,956	9.88	18.70	14.03	19.90	47.07%	31.86%
ALLTEL NEW YORK, INC.	47,047,452	87,601	9.69	12.55	11.21	15.65	53.12%	41.25%
CONTEL OF PA, INC D/B/A GTE PA	57,304,560	87,102	8.68	11.00	9.86	13.60	50.97%	34.22%
CONTEL OF THE WEST, INC D/B/A GTE WEST	104,528,000	86,457	10.83	17.29	14.73	21.68	60.34%	41.65%
CONTEL OF KANSAS, INC D/B/A GTE SYS OF IA & AR	49,215,898	82,532	6.86	7.26	7.11	10.15	62.64%	38.86%
CONTEL OF ARKANSAS, INC D/B/A GTE AR	66,432,011	77,650	9.99	17.35	14.13	20.62	56.17%	37.40%
ALLTEL ARKANSAS, INC.	50,012,581	75,641	7.16	17.11	12.46	18.54	53.31%	41.02%
CONTEL OF IOWA, INC D/B/A GTE IA	56,672,054	73,366	9.81	14.98	12.98	19.11	61.36%	36.41%
CONTEL OF KENTUCKY, INC D/B/A GTE KY	52,738,396	71,417	7.57	18.40	13.87	21.01	58.21%	40.38%
UNITED TEL CO OF THE CAROLINAS	45,700,014	71,216	9.01	13.39	11.49	16.53	56.47%	41.23%
CITIZENS UTILITIES CO OF CA	162,760,575	70,827	10.52	42.16	42.06	70.08	99.69%	70.99%
UNITED TEL CO OF KANSAS	57,819,505	70,220	6.85	17.67	12.65	18.97	53.63%	33.34%
CONTEL OF THE SOUTH, INC.-GA D/B/A GTE SOUTH-	51,063,629	64,992	10.60	21.67	17.48	26.44	62.07%	40.47%
CENTRAL TEL CO OF OH	39,502,638	63,497	7.99	20.53	16.06	24.87	64.36%	39.14%
ALLTEL OHIO, INC.	39,064,945	61,605	6.37	22.99	16.78	26.38	62.63%	42.25%
ALLTEL FLORIDA, INC.	49,390,096	56,229	7.82	18.16	13.64	20.45	56.27%	42.80%
CENTURY TEL OF WI	30,973,730	49,777	12.68	16.47	16.01	25.67	87.94%	57.27%
CITIZENS UTILITIES RURAL CO, INC.	38,715,388	49,560	6.66	8.84	7.79	10.84	51.69%	47.61%
CENTURY TEL OF MI, INC.	29,542,821	45,555	11.45	17.41	15.99	24.84	76.18%	52.52%
CONTEL OF MAINE, INC. D/B/A GTE MAINE	33,359,751	44,945	6.92	19.27	13.06	19.45	49.72%	35.58%
CONTEL SYS OF MO, INC. D/B/A GTE SYS MO	40,120,256	43,902	10.54	15.71	13.19	18.57	51.33%	37.13%
ALLTEL MICHIGAN, INC.	25,246,627	41,989	5.70	15.54	11.69	17.99	60.88%	42.91%
ALLTEL GEORGIA, INC.	30,946,446	40,442	7.30	25.92	16.89	25.80	51.53%	39.40%
AVERAGE	56,712,649	68,726	8.77	17.93	14.61	22.11	60.54%	41.88%
MEDIAN	NC	NC	8.57	17.32	13.61	20.17	58.69%	40.68%

FINANCIAL STATISTICS FOR THE INDIVIDUAL OPERATING UNITS OF THE SIX
INDEPENDENT TELEPHONE COMPANIES IN 1991 (CONTINUED)
(Sorted in Descending Order by Number of Access Lines)

Operating Units With Between 14,000 and 40,000 Access Lines	Total Operating Revenue 1991	Access Lines 1991	Debt Rate 1991	After-Tax Equity Rate 1991	After-Tax Capital Rate 1991	Pre-Tax Capital Rate 1991	Equity as a % of Capital 1991	Equity as a % o' Assets 1991
UNITED TEL CO OF EASTERN KS	32,779,864	39,783	9.53	28.63	21.58	33.62	63.09%	40.95%
ALLTEL OF IL, INC.	25,748,925	39,210	9.41	20.65	17.54	27.50	72.35%	49.35%
ALLTEL OF SC, INC.	22,039,877	35,635	8.35	19.74	14.57	21.76	54.66%	40.42%
CONTEL OF VT, INC. D/B/A GTE VT	27,999,030	34,618	10.13	16.04	13.30	19.04	53.68%	36.13%
UNITED TEL OF THE WEST, INC	19,751,480	31,181	9.27	19.46	15.08	22.47	57.00%	39.71%
ALLTEL MO, INC.	17,658,523	28,399	6.71	20.55	12.71	18.65	43.35%	34.35%
CONTEL OF WV D/B/A GTE WV	23,061,141	27,658	8.36	13.03	10.67	14.98	49.55%	33.50%
CENTURY TEL MIDWEST, INC.	14,540,487	23,769	11.27	13.61	12.97	19.57	72.75%	51.38%
ALLTEL AL, INC.	15,516,525	18,602	6.36	28.46	18.76	29.40	56.11%	40.33%
ALLTEL KY, INC.	9,184,321	17,762	6.24	27.54	16.55	25.44	48.41%	37.21%
TEXAS ALLTEL, INC.	25,518,087	17,275	20.29	19.21	19.28	31.27	93.64%	75.67%
ALLTEL TN, INC.	7,186,511	15,812	6.82	9.71	8.11	11.00	44.68%	32.44%
CENTRAL LOUISIANA TEL	13,483,956	15,792	8.12	19.82	16.30	25.54	69.93%	52.08%
CONTEL OF SOUTH CAROLINA D/B/A GTE SC	11,953,533	15,643	7.63	21.47	15.30	23.23	55.40%	39.73%
CENTURY TEL CO OF ARKANSAS	10,746,650	14,611	12.01	11.43	11.54	17.60	79.57%	52.84%
AVERAGE	18,477,927	25,050	9.37	19.29	14.95	22.74	60.95%	43.74%
MEDIAN	NC	NC	8.36	19.74	15.08	22.47	56.11%	40.33%

Operating Units With Less Than 14,000 Access Lines	Total Operating Revenue 1991	Access Lines 1991	Debt Rate 1991	After-Tax Equity Rate 1991	After-Tax Capital Rate 1991	Pre-Tax Capital Rate 1991	Equity as a % of Capital 1991	Equity as a % o Assets 1991
OKLAHOMA ALLTEL, INC.	10,893,805	13,844	8.99	20.49	14.97	22.08	52.02%	42.16%
ALLTEL OKLAHOMA, INC.	12,288,836	13,616	6.76	20.58	15.40	23.97	62.48%	48.98%
UNITED TEL CO OF SOUTHCENTRAL KANSAS	8,691,065	10,648	7.08	29.27	19.95	31.27	58.00%	38.55%
CONTEL OF ND, INC. D/B/A GTE ND	7,910,885	10,041	8.59	16.15	12.83	18.87	56.09%	38.61%
CONTEL OF NH, INC. D/B/A GTE NH	9,093,055	9,508	13.58	28.67	22.04	32.75	56.05%	35.16%
CITIZENS UTILITIES CO OF AZ	12,354,198	9,368	0.00	12.12	12.12	20.19	100.00%	70.85%
ALLTEL INDIANA, INC.	5,348,333	8,921	4.85	24.35	15.41	24.20	54.15%	41.84%
ALLTEL MS, INC	6,701,918	8,494	7.33	23.22	16.31	25.06	56.52%	43.33%
CONTEL OF SD, INC. D/B/A GTE SD	6,197,914	8,052	6.74	14.48	10.26	14.64	45.40%	34.91%
CENTURY TEL OF NORTH LA, INC.	8,134,231	6,383	10.90	25.73	20.72	32.09	66.23%	47.19%
CITIZENS UTILITIES CO OF PA	2,710,530	3,483	0.00	9.82	9.82	16.37	100.00%	91.27%
CENTURY TEL OF IDAHO, INC.	3,398,093	3,381	13.51	22.82	21.28	33.97	83.41%	52.62%
ALLTEL TX, INC.	2,235,020	3,258	8.46	14.15	11.29	15.97	49.67%	38.23%
CENTURY TEL CO, INC.	2,775,057	2,166	10.56	20.90	16.51	24.53	57.56%	45.20%
AVERAGE	7,052,353	7,940	7.67	20.20	15.64	24.00	64.11%	47.78%
MEDIAN	NC	NC	7.90	20.74	15.40	24.09	57.04%	42.75%

Source: "Statistics of the Local Exchange Carriers 92," USTA, July 1992.

APPENDIX 10

FINANCIAL MANAGEMENT: THEORY AND PRACTICE

Financial Management
Theory and Practice

Fourth Edition

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The capital structure theories presented thus far are based on assertions about investor behavior rather than a carefully constructed formal proof. In what has been called the most important paper on financial research ever published. Franco Modigliani and Merton Miller (MM) addressed the capital structure issue in a rigorous, scientific fashion, and they set off a chain of research that continues to this day.[3]

The Modigliani-Miller Models

To begin. MM made the following assumptions, some of which were later relaxed:

Assumptions

1. Firms' business risk can be measured (by σ_{EBIT}), and firms with the same degree of business risk are said to be in a *homogeneous risk class*.

2. All present and prospective investors have identical estimates of each firm's future EBIT; that is, investors have *homogeneous expectations* about expected future corporate earnings and the riskiness of these earnings. This assumption is comparable to our use of a "representative investor" in earlier chapters when we discussed the DCF model and market equilibrium ($k_s = k_s$).

3. Stocks and bonds are traded in *perfect capital markets*. This assumption implies, among other things, (1) that there are no brokerage costs and (2) that investors (both individuals and institutions) can borrow at the same rate as corporations.

4. The debt of firms and individuals is riskless, so the interest rate on debt is the risk-free rate. Further, this situation holds regardless of how much debt a firm (or an individual) issues.

5. All cash flows are perpetuities: that is, the firm is a zero-growth firm with an "expectationally constant" EBIT, and its bonds are perpetuities. "Expectationally constant" means that we expect EBIT to attain some constant level each year, but the actual level could be different from the expected level, i.e., some risk is present. *

MM first performed their analysis under the assumption that there are no corporate income taxes. Based on the preceding assumptions, and in the absence of corporate taxes, MM stated and then proved two propositions:

MM without Corporate Taxes

[3]See Franco Modigliani and Merton H. Miller. "The Cost of Capital. Corporation Finance and the Theory of Investment." *American Economic Review*. June 1958, 261-297: "The Cost of Capital. Corporation Finance and the Theory of Investment: Reply." *American Economic Review*. September 1958, 655-669: "Taxes and the Cost of Capital: A Correction." *American Economic Review*. June 1963, 433-443; and "Reply." *American Economic Review*. June 1965, 524-527. In a 1979 survey of Financial Management Association members, the original MM article was judged to have had the greatest impact on the field of finance of any work ever published. See Philip L. Cooley and J. Louis Heck. "Significant Contributions to Finance Literature." *Financial Management*. Tenth Anniversary Issue 1981, 23-33.

Proposition I. *The value of the firm is established by capitalizing the expected net operating income (NOI = EBIT) at a rate appropriate for the firm's risk class:*

$$V = \frac{EBIT}{k_s} = \frac{EBIT}{k_{sU}}.$$

Here k_{sU} is the required rate of return for an unlevered, or all-equity, firm in a given risk class.

Since V is established by the Proposition I equation, *under the MM theory, the value of the firm is independent of its leverage.* This also implies that the average cost of capital to any firm, leveraged or not, is (1) completely independent of its capital structure and (2) equal to the capitalization rate of an unlevered firm in the same risk class. Thus, MM's Proposition I is identical to the NOI hypothesis as expressed in Figure 11-1.

Proposition II. *The cost of equity to a levered firm is equal to the cost of equity to an unlevered firm plus a risk premium which depends in the following way on the degree of financial leverage the firm uses:*

$$k_{sL} = k_{sU} + \text{Risk premium}$$
$$= k_{sU} + (k_{sU} - k_d)(D/S).$$

Here the subscripts L and U designate levered and unlevered firms in a given risk class, and Proposition II states that as the firm's use of debt increases, its cost of equity also rises, and in an exactly specified manner.

Taken together, the two MM propositions imply that the inclusion of more debt in the capital structure will not increase the value of the firm because the benefits of cheaper debt will be exactly offset by an increase in the cost of equity. *Thus, the basic MM theory states that in a world without taxes, both the value of a firm and its cost of capital are completely unaffected by its capital structure.*

Proof of the MM Propositions without Corporate Taxes

Proof of Proposition I. MM use an *arbitrage proof* to support their propositions. They show that, under their assumptions, if two companies differ only (1) in the way they are financed and (2) in their total market values, then investors will sell shares of the overvalued firm, buy those of the undervalued firm, and continue this process until the companies have exactly the same market value. To illustrate, assume that two firms, Firm L (for levered) and Firm U (for unlevered), are identical in all important respects except financial structure. Firm L has $4,000,000 of 7.5 percent debt, while Firm U is all equity financed. Both firms have EBIT = $900,000, and σ_{EBIT} is the same for both firms, so they are in the same risk class.

said to have a greater "debt-carrying capacity" than assets such as capitalized R&D costs. As we noted in Chapter 10, some consideration should be given to debt capacity in the capital budgeting process, if it is important in individual cases.

The Miller Model

Although MM included *corporate* taxes in the second version of their model, they did not extend the model to include *personal* tax effects. However, in his 1976 presidential address to the American Finance Association, Merton Miller did introduce a model designed to show how leverage affects firm value when both personal and corporate taxes are taken into account.[11] To explain Miller's model, let us begin by defining T_c as the corporate tax rate, T_s as the personal tax rate on stock income, and T_d as the personal tax rate on debt income. Note that stock returns come partly as dividends and partly as capital gains, so T_s is a weighted average of the tax rates on dividends and capital gains, while essentially all debt income comes from interest, which is all taxed at the top rates.

With personal taxes included, the value of an unlevered firm with a constant cash flow is found as follows:

$$V_U = \frac{EBIT(1 - T_c)(1 - T_s)}{k_{sU}}.$$ (11-8)

The $(1 - T_s)$ term adjusts for personal taxes. Therefore, the numerator shows how much of the firm's operating income is left after the firm itself pays corporate income taxes and the investors subsequently pay personal taxes on dividend and capital gains. Since the introduction of personal taxes lowers the numerator, these taxes are seen to reduce the value of the unlevered firm.

Moving on to the levered firm, we first partition its annual cash flows, CF_L, into those going to the stockholders and to the bondholders as follows:

$$CF_L = \text{Net CF to stockholders} + \text{Net CF to bondholders}$$ (11-9)

$$= (EBIT - I)(1 - T_c)(1 - T_s) + I(1 - T_d).$$

Here I is the annual interest payment.

Equation 11-9 can be rearranged as follows:

$$CF_L = EBIT(1 - T_c)(1 - T_s) - I(1 - T_c)(1 - T_s) + I(1 - T_d).$$ (11-9a)

The first term in Equation 11-9a is merely the after-tax cash flow of an unlevered term, and the present value of this term is found by discounting the perpetual cash flow by k_{sU}. The second and third terms, which

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[11]See Merton H. Miller. "Debt and Taxes." *Journal of Finance*, May 1977, 261-273.

reflect leverage, result from the cash flows produced by interest payments. These two cash flows are assumed to be of equal risk as the basic interest rate stream, and hence their present values are obtained by dividing by the cost of debt, k_d. Combining the present values of the three terms, we obtain this value for the levered firm:

$$V_L = \frac{EBIT(1 - T_c)(1 - T_s)}{k_u} - \frac{I(1 - T_c)(1 - T_s)}{k_d} + \frac{I(1 - T_d)}{k_d}. \quad (11\text{-}10)$$

The first term in Equation 11-10 is equal to V_U as set forth in Equation 11-8, and we can consolidate the second two terms:

$$V_L = V_U + \frac{I(1 - T_d)}{k_d}\left[1 - \frac{(1 - T_c)(1 - T_s)}{(1 - T_d)}\right]. \quad (11\text{-}10a)$$

Now recognize that the after-tax perpetual interest payment divided by the required rate of return on debt, $I(1 - T_d)/k_d$, equals the market value of the debt, D. Substituting D into the preceding equation, and putting it at the end, we obtain this expression:

$$V_L = V_U + \left[1 - \frac{(1 - T_c)(1 - T_s)}{(1 - T_d)}\right]D. \quad (11\text{-}10b)$$

Equation 11-10b is the very important Miller Model.

The Miller Model has several significant implications:

1. The term in brackets,

$$\left[1 - \frac{(1 - T_c)(1 - T_s)}{(1 - T_d)}\right],$$

multiplied by D is the gain from leverage. The bracketed term replaces the factor $T = T_c$ in the earlier MM model with corporate taxes.

2. If we ignore all taxes, that is, if $T_c = T_s = T_d = 0$, then the bracketed term reduces to zero, which is the same as the original MM model without corporate taxes.

3. If we ignore personal taxes, that is, if $T_s = T_d = 0$, then the bracketed term reduces to $[1 - (1 - T_c)] = T_c$, which is the same as in the MM model with corporate taxes.

4. If the personal tax rates on stock and bond incomes were equal, that is, if $T_s = T_d$, then the bracketed term would again reduce to T_c.

5. However, under U.S. tax laws, the personal tax rate on stock is less than the personal tax rate on bonds due to the favorable treatment of capital gains. Thus, $T_s < T_d$. Under this condition, the bracketed term is less than T_c, and the value of debt is less than would be true in the absence of personal taxes.

6. If $(1 - T_c)(1 - T_s) = (1 - T_d)$, then the value of debt to the firm would be reduced to zero. Here, the tax advantage of debt to the firm

would be exactly offset by the personal tax advantage of equity. Miller himself took this position, which implies that there is no advantage to a firm's use of debt. Thus, Miller's 1977 paper leads to the same conclusion as his and Modigliani's 1958 no-tax position, namely, that capital structure has no effect on a firm's value or its cost of capital.

7. Miller did go on to argue that there is an optimal level of corporate debt in the aggregate and that aggregate corporate debt will somehow reach the optimal level. Still, for any individual firm, one capital structure should, according to Miller, be as good as any other.

Others have extended and tested Miller's 1977 analysis. Generally, these extensions disagree with Miller's earlier conclusion that there is no advantage whatever from the use of corporate debt. In all probability, based on the most recently available empirical evidence, the product $(1 - T_e)(1 - T_s)$ is less than $(1 - T_d)$, and this condition gives rise to some tax advantage to the use of corporate debt. However, Miller's 1977 work does show that the tax advantages of debt are clearly less than were implied in the original MM with-tax article.

## The Current View of Financial Leverage

The great contribution of MM and their followers was that they specifically identified the benefits and costs of using debt—the tax effects, bankruptcy costs, EBIT effects, agency costs, and interest rate effects. Prior to MM, no good capital structure theory existed, so we had no way of rationally considering just how much debt a firm should use.

The current view of most authorities is captured in Figure 11-4. The top graph shows the relationship between the debt ratio and the costs of debt, equity, and the average cost of capital. Both k_s and $k_d(1 - T)$ rise steadily with increases in leverage, but the rate of increase accelerates at higher debt levels, reflecting the increased likelihood of bankruptcy and its related costs and effects on EBIT. The weighted average cost first declines, then hits a minimum at D/V^*, and then begins to rise. Note, however, that the k_a curve is shaped more like a shallow bowl than like a sharp V, indicating that over a fairly wide range the debt ratio does not have a pronounced effect on the average cost of capital.

The bottom graph in Figure 11-4 shows the general relationship between the value of the firm and its debt ratio. This graph is similar to the "actual value" line in Figure 11-3. Notice that the same debt ratio which minimizes the weighted average cost of capital also maximizes the firm's value. Thus, the optimal capital structure can be defined in terms of cost minimization or value maximization, for the same capital structure does both.

It is interesting to note that Figure 11-4 looks very much like the graphs on the right side of Figure 11-1, which represent the traditional position. Although the traditionalists did not state very clearly why they

**Figure 11-4
Effects of Leverage:
The Current View**
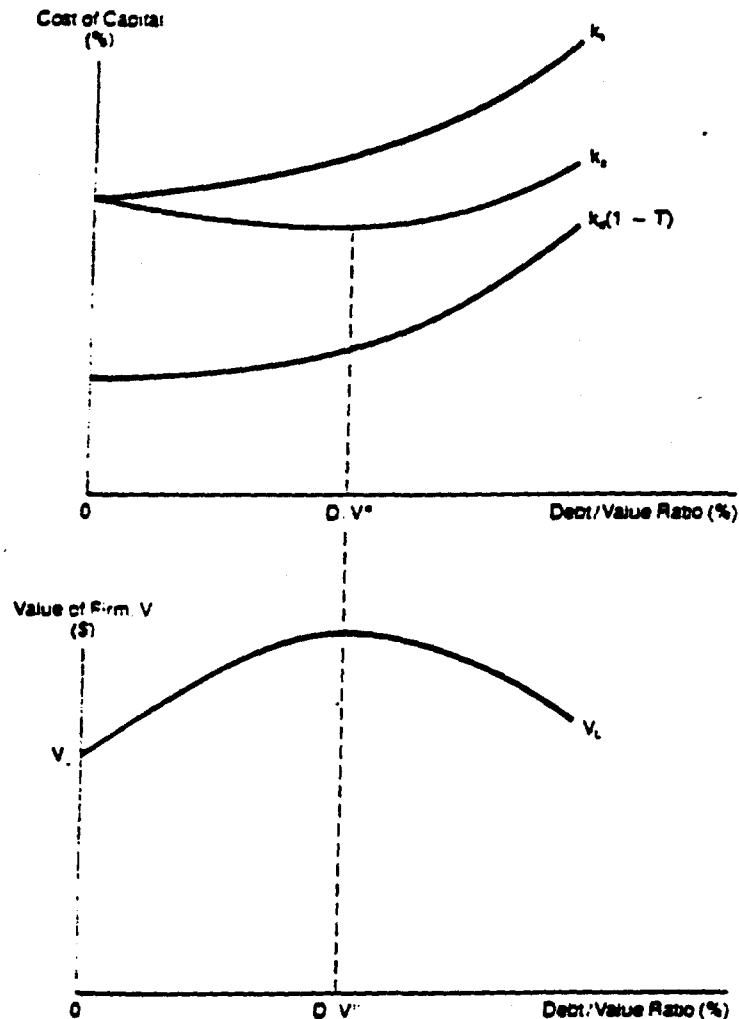
felt the graphs took their assumed shapes, we can use the modern theory to help with this explanation. First, debt has benefits, the most significant of which is tax deductibility. However, increased debt also has costs, the primary ones being related to potential bankruptcy, agency problems, lower EBIT beyond some debt level, and rising interest rates. *The optimal capital structure is that structure at which the marginal benefits of leverage equal the marginal costs.*

APPENDIX 11

UTILITIES' COST OF CAPITAL

Utilities'
Cost of Capital

by
Roger A. Morin, Ph.D.

Public Utilities Reports, Inc.
Arlington, Virginia